

REMARKS

Claim 13 has been amended. Claims 1-18, 20-25, 27-28 and 30-32 are present in the application. Of these, Claims 1-14 have been examined on the merits, and Claims 15-18, 20-25, 27-28 and 30-32 are currently withdrawn from consideration on the merits. In view of the foregoing amendment, and the remarks that follow, reconsideration is respectfully requested.

Dependent Claim 13

The Office Action objected to dependent Claim 13, suggesting that Applicants consider changing the dependency of this claim (in effect to provide a better antecedent basis for certain subject matter recited in Claim 13). The foregoing amendment to Claim 13 does not change the dependency, but does adjust the wording of Claim 13 in a manner that is believed to cure the basis for the objection. This amendment improves the form of Claim 13, but does not change the intended scope of Claim 13.

Independent Claim 1

Independent Claim 1 stands rejected under 35 USC §103 as obvious in view of a proposed combination of teachings from Agarwal U.S. Application Publication No. 2003/0132428, Ahn U.S. Application Publication No. 2002/0022308, and Huang U.S. Patent No. 6,323,106. This ground of rejection is respectfully traversed. In this regard, the PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Agarwal, Ahn and Huang fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 1, for the mutually exclusive reasons that are discussed separately below.

THE PROPOSED COMBINATION DOESN'T TEACH ALL THE CLAIM LIMITATIONS

The provisions of MPEP §2142 specify with respect to §103 that:

To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest all the claim limitations. (Emphasis added).

The PTO considers this requirement to be important, as evidenced by the fact that this exact language appears not only in MPEP §2142, but also in other sections of the MPEP, including MPEP §706.02(j) and MPEP §2143. In the present situation, however, the proposed combination of Agarwal, Ahn and Huang does not teach all of the limitations of Claim 1.

To begin with, Applicants' Claim 1 includes a recitation of:

. . . performing an anneal procedure to activate said ions and forming said doped insulator region in portions of said insulator layer . . .

The Office Action admits at lines 11-16 on page 4 that Agarwal does not teach this anneal procedure. Nor does the Office Action look to Ahn. Instead, the Office Action asserts that a comparable anneal procedure is disclosed in the paragraph at lines 25-37 in column 6 of Huang. However, this paragraph of Huang does not actually teach any anneal procedure at all. The paragraph does state that Huang's device might eventually experience "thermal cycles", which is rather clearly a reference to thermal variations that may possibly occur after fabrication has been

completed, in particular due to variations in ambient conditions during normal operational use of the completed device in some real-world application. But a person skilled in the art will readily understand that these thermal cycles after completion of fabrication are not comparable to an anneal procedure performed during fabrication for the specific purpose of intentionally altering a structural characteristic of the device that is being fabricated. In this regard, Huang does not teach or suggest that the mentioned "thermal cycles" will activate ions, whereas Claim 1 expressly recites "performing an anneal procedure to activate said ions". In fact, although the Office Action asserts at lines 3-9 on page 5 that "Huang teaches . . . performing an anneal procedure to activate said ions", the Office Action admits on page 7 that this statement is not actually true, in particular by admitting in line 19 on page 7 that "Agarwal in view of Ahn and Huang fails to teach annealing to active [sic] the ions" (emphasis in original). Consequently, the proposed combination of teachings here does not include anything comparable to the annealing limitation from Applicants' Claim 1. In other words, even when the indicated teachings from Agarwal, Ahn and Huang are combined, they fail to satisfy the requirement of MPEP §2142 that they must collectively "teach or suggest all the claim limitations" (emphasis added).

As another example, Applicants' Claim 1 also includes a recitation of:

. . . performing an ion implantation procedure . . . to place ions in
portions of said insulator layer underlying portions of said
semiconductor shapes . . .

The Office Action admits at lines 11-16 on page 4 that Agarwal does not teach this implanting of ions in a portion of an insulator layer underlying semiconductor shapes. Nor does the Office Action look to Ahn. Instead, the Office Action asserts that Huang discloses implanting of ions in a portion of an insulator layer underlying semiconductor shapes, in particular in Figure 3C and in the paragraph at lines 25-37 of column 6. However, these portions of Huang do not actually disclose implanting of ions in a portion of an insulator layer underlying semiconductor shapes.

More specifically, as best seen in Figure 3C, Huang's device includes an oxide insulator layer 302, and Huang uses an implant procedure to implant nitrogen in a central portion 308 of the oxide layer 302, in order to form oxynitride. However, there are no semiconductor shapes above the oxide layer 302. Instead, the only material above the oxide layer 302 is a nitride layer 304 (which is clearly not a semiconductor). In addition, and contrary to the assertions in the Office Action, Huang does not actually teach that any of the implanted nitrogen ends up in the portions of the oxide layer that are below any of the nitride shapes 304. Instead, Huang teaches that all implanted nitrogen ends up in the central portion 308 of the oxide layer 302, and the central portion 308 is not below any other structure. Moreover, with reference to Figure 3D and lines 11-17 in column 6, implantation is promptly followed by a chemical mechanical polishing (CMP) procedure that removes the nitride shapes 304 and the portions of the oxide layer 302 beneath the nitride shapes 304. Thus, even if some small amount of nitrogen did happen to end up in portions of the oxide layer 302 beneath the nitride shapes 304, those portions of the oxide layer would be immediately removed by CMP, and thus would not be present in the completed device for any purpose, much less for the specific purpose of helping to reduce a boron segregation phenomenon. Consequently, the combination of teachings proposed by the Office Action does not include anything comparable to the recitation in Applicants' Claim 1 of "performing an ion implantation procedure . . . to place ions in portions of said insulator layer underlying portions of said semiconductor shapes". In other words, even when the indicated teachings from Agarwal, Ahn and Huang are combined, they fail to satisfy the requirement of MPEP §2142 that they must collectively "teach or suggest all the claim limitations" (emphasis added).

Summarizing, the proposed combination of Agarwal, Ahn and Huang does not include anything comparable to either of the two above-quoted limitations from Applicants' Claim 1. Thus, Agarwal, Ahn and Huang fail to satisfy the requirement of MPEP §2142 that they must collectively "teach or suggest all the claim limitations" (emphasis added). For this independent reason alone, it is respectfully submitted that Agarwal, Ahn and Huang fail to establish a prima

facie case of obviousness under 103, and that the pending §103 rejection must therefore be withdrawn. Notice to that effect is respectfully requested.

THE PROPOSED MODIFICATION OF AGARWAL IS NOT PROPER

There is yet another reason why the proposed modification of Agarwal is not proper under §103. In this regard, MPEP §2142 provides that:

To reach a proper determination under §103, the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. . . . Knowledge of applicant's disclosure must be put aside in reaching this determination, . . . impermissible hindsight must be avoided, and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

In addition, the MPEP provides at § 2143.01 that:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. . . . Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so". (Emphasis in original).

As discussed above, the Office Action asserts that it would be obvious to modify Agarwal in view of Ahn and also in view of Huang. One problem with this assertion is that, as discussed

above, Huang does not actually disclose certain features, such as implantation of ions in portions of an insulating layer located below semiconductor shapes, or use of an anneal procedure to activate implanted ions. Consequently, even assuming that a person skilled in the art attempted to modify Agarwal in view of Huang, the modified version of Agarwal that resulted would not include implantation of ions in portions of an insulating layer located below semiconductor shapes, or use of an anneal procedure to activate implanted ions, because neither Agarwal nor Huang discloses these features. Stated differently, the §103 rejection has not identified anything in the prior art that would motivate a person skilled in the art to modify Agarwal so as to add these specific features, because neither Agarwal nor Huang discloses these features.

Consequently, the Office Action does not properly establish any motivation for making the proposed modification, much less explain how the prior art would serve as the basis for any such motivation. Thus, since Agarwal, Ahn and Huang all fail to disclose these specific features, the Office Action is essentially asserting that adding these features to Agarwal would simply be a change that is well within the ordinary skill of the art. Stated differently, the Office Action is effectively relying on the level of skill in the art to provide the motivation to modify Agarwal so as to add the specific features of implanting ions in portions of an insulating layer located below semiconductor shapes, and using an anneal procedure to activate the implanted ions. However, this approach is directly prohibited by the provisions of MPEP §2143.01, which state that:

FACT THAT THE CLAIMED INVENTION IS WITHIN THE
CAPABILITIES OF ONE OF ORDINARY SKILL IN THE ART
IS NOT SUFFICIENT BY ITSELF TO ESTABLISH *PRIMA*
FACIE OBVIOUSNESS

A statement that modifications of the prior art to meet the claimed invention would have been " 'well within the ordinary skill of the art at the time the claimed invention was made' " because the

references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. [Case citations omitted] . . . (The level of skill in the art cannot be relied upon to provide the suggestion to combine references).

Thus, the approach taken by the Office Action is an approach that is directly prohibited by the provisions of the MPEP, because MPEP §2143.01 emphasizes that the level of skill in the art cannot be relied upon to provide the suggestion for modifying the teachings of a reference like Agarwal. The present §103 rejection of Claim 1 is therefore not complete, because it fails to demonstrate the motivation that is required by the MPEP. In effect, since Agarwal, Ahn and Huang all fail to disclose implantation of ions in portions of an insulating layer located below semiconductor shapes, or use of an anneal procedure to activate implanted ions, the §103 rejection is ultimately based on hindsight of the present invention, rather than on motivation properly derived from what was known prior to the present invention. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 1 is not rendered obvious under §103 by Agarwal, Ahn and Huang, and notice to that effect is respectfully requested.

Summarizing, it is respectfully submitted that Agarwal, Ahn and Huang fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 1, for various different reasons that have been discussed separately above. Claim 1 is therefore believed to be allowable, and notice to that effect is respectfully requested.

Dependent Claims

Claims 2-14 and 30-32 depend from Claim 1, and are also believed to be patentably distinct from the art of record, for example for the same reasons discussed above with respect to Claim 1.

Conclusion

Based on the foregoing, it is respectfully submitted that all of the pending claims are fully allowable, and favorable reconsideration of this application is therefore respectfully requested. If the Examiner believes that examination of the present application may be advanced in any way by a telephone conference, the Examiner is invited to telephone the undersigned attorney at 972-739-8647.

Although Applicants believe that no additional fees are due, the Commissioner is hereby authorized to charge any fees required by this paper, or to credit any overpayment, to Deposit Account No. 08-1394 of Haynes and Boone, LLP.

Respectfully submitted,



T. Murray Smith
Registration No. 30,222
(972) 739-8647

Date: January 4, 2006

HAYNES AND BOONE, LLP
901 Main Street, Suite 3100
Dallas, Texas 75202-3789
Telephone: (972) 739-8647
Facsimile: (214) 200-0853
File: 24061.528

Enclosures: Petition for Time Extension
Check (\$120)
Acknowledgment Post Card

R-117888.1